



# 1969

## OPERATING SUMMARY

# BURLINGTON

(Drury Lane)

## water pollution control plant

TD  
367  
.A56  
B874  
1969  
MOE

RARY COPY

JUN 26 1970

ONTARIO WATER  
RESOURCES COMMISSION

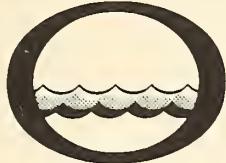
ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

**TD**  
**367**  
**.A56**  
**B874**  
**1969**

Burlington Drury Lane : water  
pollution control plant.

81574



*Water management in Ontario*

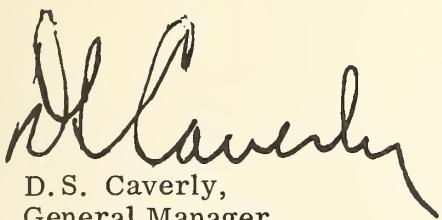
Ontario  
Water Resources  
Commission

135 St.Clair Ave.W.  
Toronto 195  
Ontario

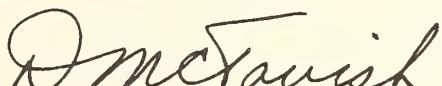
The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

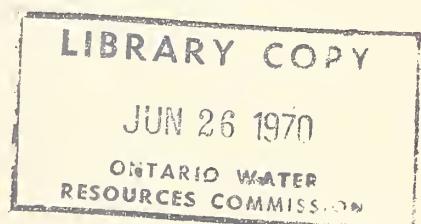
Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.



D. S. Caverly,  
General Manager.



D. A. McTavish, P. Eng.,  
Director,  
Division of Plant Operations.



TD

227

B87

L78

J38

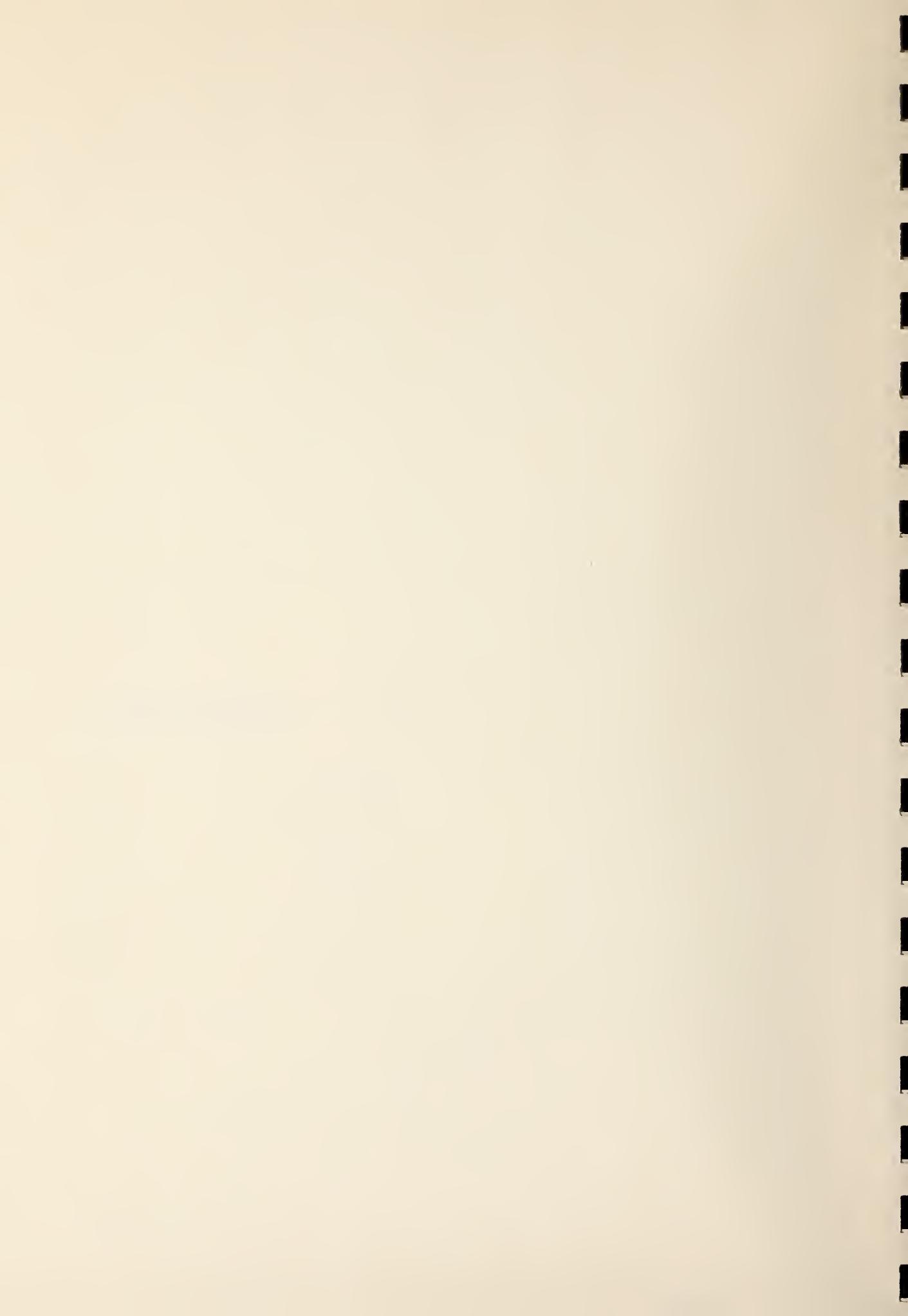
1969

252

Asha

## **CONTENTS**

Title page . . . . .	1
Flow diagram . . . . .	2
Design data . . . . .	3
'69 Review . . . . .	4
Project costs . . . . .	6
Process data . . . . .	9



**BURLINGTON DRURY LANE  
water pollution control plant**

**ONTARIO WATER RESOURCES COMMISSION**

**CHAIRMAN**  
D.J. Collins

**VICE-CHAIRMAN**  
J. H. H. Root, M.P.P.

**COMMISSIONERS**  
H. E. Brown  
D. A. Moodie  
L. E. Venchiarutti

**GENERAL MANAGER**  
D. S. Caverly

**ASSISTANT GENERAL MANAGERS**  
L. E. Owers  
K. H. Sharpe  
F. A. Voege  
A. K. Watt

**COMMISSION SECRETARY**  
W. S. MacDonnell

**DIVISION OF PLANT OPERATIONS**

**Director**  
D. A. McTavish

**Assistant Director**  
C. W. Perry

**Regional Supervisor**  
P. J. Osmond

**Operations Engineer**  
J. Wesno

135 St. Clair Avenue West,  
Toronto 7

operated for

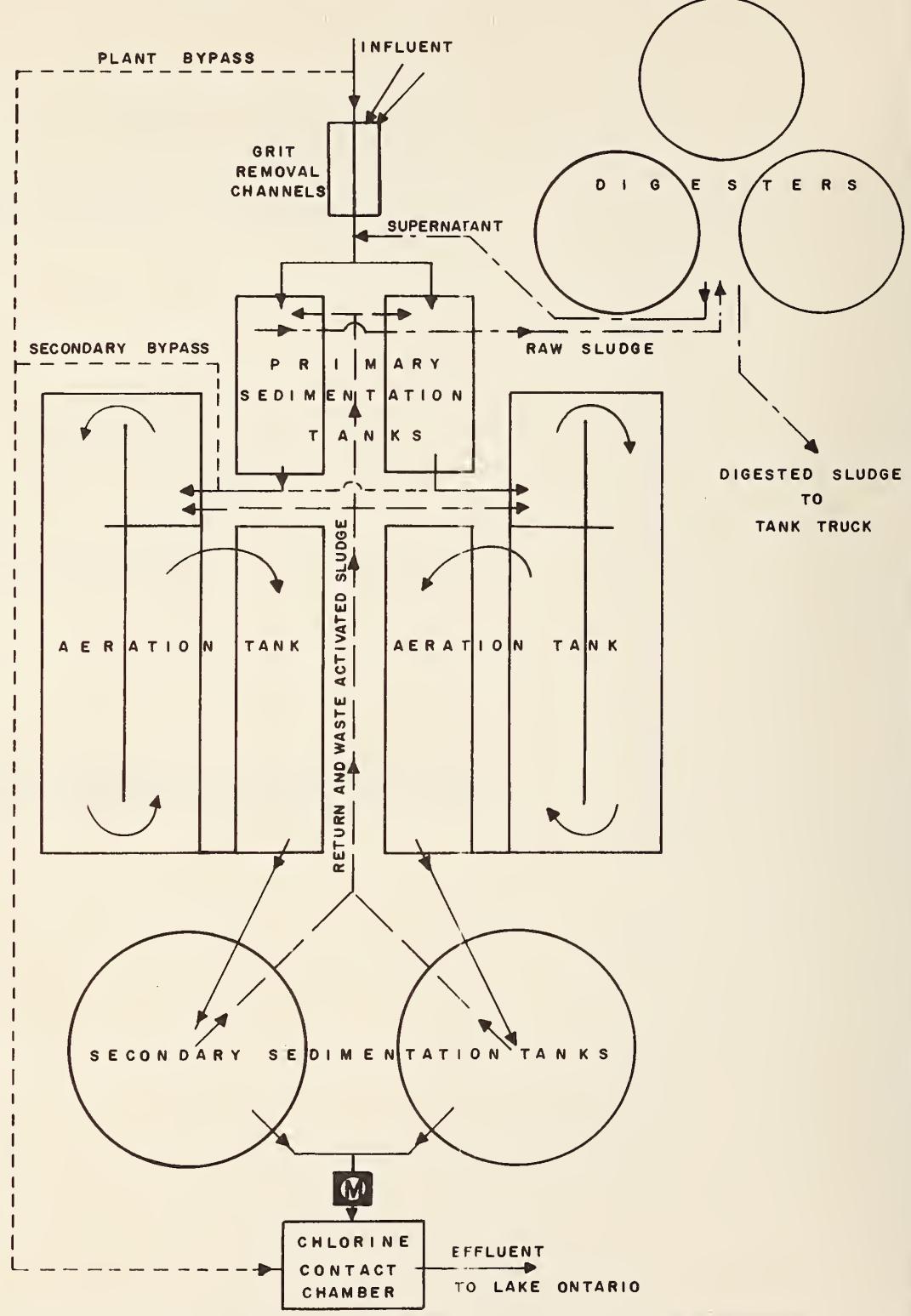
**THE TOWN OF BURLINGTON**

by the

**ONTARIO WATER RESOURCES COMMISSION**

**1969 ANNUAL OPERATING SUMMARY**

BURLINGTON DRURY LANE  
WATER POLLUTION CONTROL PLANT



# DESIGN DATA

PROJECT NO.	2-0051-60	TREATMENT	Activated Sludge
DESIGN FLOW	2.5 mgd	DESIGN POPULATION	30,000
BOD - Raw Sewage - Removal	200 mg/l 90%	SS - Raw Sewage - Removal	180 mg/l 90%

## PRIMARY TREATMENT

### Screening

1" bar screens

### Grit Removal

Type: Grit channels  
Retention: 0.8 min

### Primary Sedimentation

Type: Walker Process  
Size: Two 49.3' x 18' x 12.25'  
(135,700 gal)  
Retention: 1.3 hr  
Loading: Surface, 1400 gal/ft<sup>2</sup>/day  
Weir, 17,100 gal/ft/day

## SECONDARY TREATMENT

### Aeration Tanks

Type: Diffused air; triple-pass  
Size: Two tanks, each with  
2 passes 118' x 18' x 10.7'  
1 pass 85.5' x 18' x 10.7'  
(833,000 gal. total)  
Retention: 8.0 hours

### Air Supply

One Sutorbilt - 1500 cfm  
Two Roots-Connerville - 750 cfm

### Diffusers - (each tank)

1) 132 Schumacher Brandel tubes in  
first two passes

2) 41 Spargers on 2' centres in third  
pass

### Secondary Sedimentation

Type: Rex Unitube Tow-Bro  
Size: Two 50' dia x 10.6' swd  
(260,000 gal)  
Retention: 2.5 hr  
Loading: Surface, 1000 gal/ft<sup>2</sup>/day  
Weir, 8500 gal/ft/day

### CHLORINATION

Type: Kent

### Chlorine Contact Chamber

- in outfall

### OUTFALL

- to Lake Ontario

### SLUDGE HANDLING

#### Digestion System

Type: Two-stage

Primary --

Size: Two 40' dia tanks (313,000 gal  
total)  
Loading: 2.7 lb/ft<sup>3</sup>/mo

Secondary --

Size: One 40' dia tank (143,000 gal)  
Loading Total: 1.9 lb/ft<sup>3</sup>/mo

# '69 REVIEW

## GENERAL

The Burlington Drury Lane water pollution control plant treated an estimated total of 594.9 million gallons of raw sewage during the year, an increase of approximately five percent over 1968. The plant flow metering became inoperative in November, and flow data included in the total for the last two months of 1969 are therefore estimates. The total plant return sludge flow metering equipment will be replaced early in 1970.

The average raw sewage strength of 215 milligrams per litre BOD was 16 percent less than in 1968. The average suspended solids concentration of 299 mg/l was 32% less than in the previous year. This did not, however, result in a better average effluent quality in 1969 because a toxic industrial waste in December resulted in poor BOD and suspended solids reductions and lowered the average considerably. The Division of Industrial Wastes, in conjunction with the Town's industrial wastes inspector, is investigating the problem.

The average effluent BOD and suspended solids concentrations of 15 and 20 mg/l respectively were marginally satisfactory.

## EXPENDITURES

The 1969 operating costs for the Burlington Drury Lane plant were \$42,152.71, or \$70.86 per million gallons treated. The increase in operating costs over 1968 was minimal.

## PLANT EFFICIENCY

The average raw sewage strength of 215 mg/l exceeded the design BOD of

200 mg/l 40% of the time. The corresponding suspended solids average of 299 mg/l exceeded the design of 180 mg/l 72% of the time. Poor reductions in December due to a toxic industrial waste received at the plant were responsible for lowering the overall efficiency for the year. Despite the organic overload and the industrial waste problem the plant produced an acceptable effluent with BOD and suspended solids reductions averaging 93% each.

#### AERATION

The BOD and suspended solids removal efficiencies in the primary clarifiers averaged 32.8% and 48.2% for the year. The average aeration tank loading was 0.15 pounds of BOD per pound of MLSS, representing a reduction in loading of 0.04 pounds from 1968. The average MLSS concentration was 2,180 mg/l. The 1.04 cu. ft. of air required per pound of BOD removed was similar to the previous year's figure.

#### SLUDGE DIGESTION

A total of 1,900,000 gallons of raw sludge was pumped to the primary digester. This is approximately a 17.5% reduction from 1968 (and 32.8% from 1967). The average percent total solids increased from 4.9 in 1968 to 5.8 in 1969, accounting for the volume reduction.

A total of 4,868 cu. yd. of sludge was hauled from the plant.

## **CONCLUSIONS**

The plant operates satisfactorily and produces a good quality effluent most of the time. A toxic industrial waste in December resulted in poor treatment that month. The Division of Industrial Wastes and the Town's industrial waste inspector are investigating the source of the problem. Obsolete metering to measure total plant and return sludge flows will be replaced early in 1970.

## PROJECT COSTS

NET CAPITAL COST (Final)	\$676,033.78
DEDUCT - Payments from Municipality	<u>41,721.91</u>
Long Term Debt to OWRC	<u>\$634,311.87</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	<u>\$251,583.58</u>
Net Operating	\$ 42,152.71
Debt Retirement	23,013.00
Reserve	2,842.95
Interest Charged	<u>35,511.86</u>
TOTAL	<u>\$103,520.52</u>

### RESERVE ACCOUNT

Balance @ January 1, 1969	\$ 38,318.05
Deposited by Municipality	2,842.95
Interest Earned	<u>2,175.13</u>
	\$ 43,336.13
Less Expenditures	<u>2,274.83</u>
Balance @ December 31, 1969	<u>\$ 41,061.30</u>

## 1969 OPERATING COSTS

PAYROLL	54 %
FUEL	1 %
POWER	19 %
CHEMICALS	3 %
GENERAL SUPPLIES	3 %
EQUIPMENT	<1 %
REPAIRS & MAINTENANCE	3 %
SUNDRY	17 %
WATER	<1 %
TRAVEL	0 %

## TOTAL ANNUAL COST

NET OPERATING	41 %
DEBT RETIREMENT	22 %
INTEREST	34 %
RESERVE FUND	3 %

## Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	606.72	\$37,586.43	\$61.95	3 cents
1966	578.42	38,565.75	66.67	3 cents
1967	596.29	41,183.66	69.07	3 cents
1968	568.20	42,055.65	74.02	3 cents
1969	594.90*	42,152.71	70.86	4 cents

\* Prorated on 304 days' data

# Monthly Operating Costs

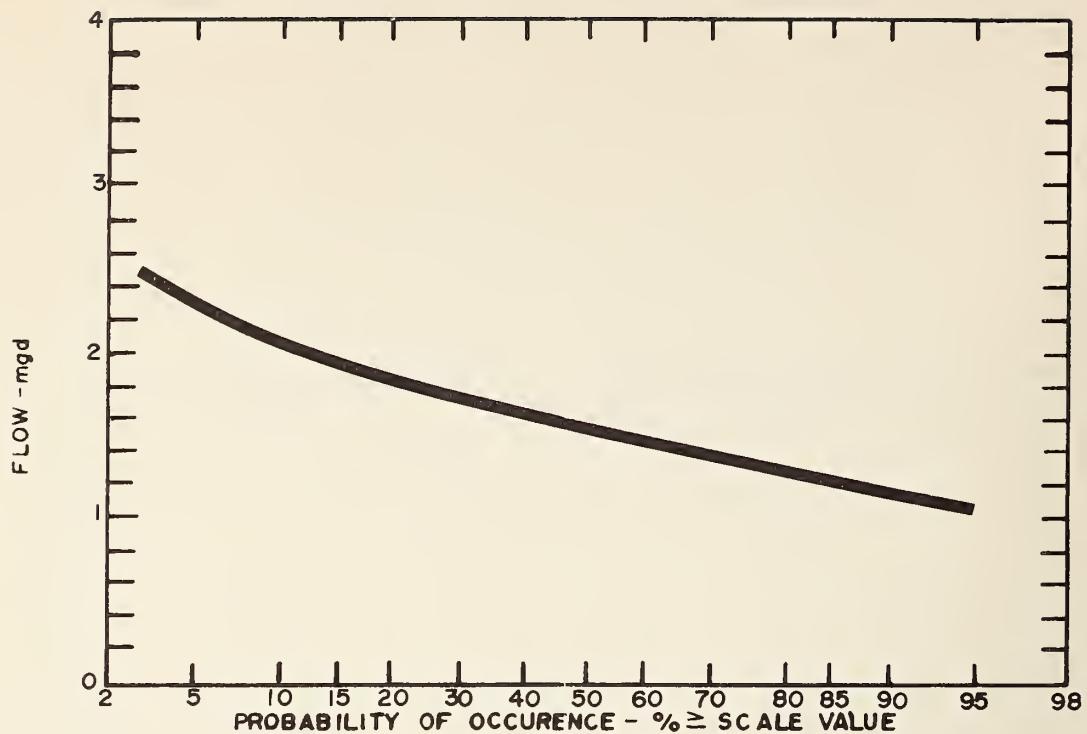
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER
JAN	2719.80	2655.44	-	-	-	48.19	-	-	46.17	16.17	-
FEB	2712.70	1519.91	-	-	603.88	44.56	99.31	-	72.80	393.37	5.50
MAR	3029.46	1732.13	-	26.97	543.66	-	51.19	-	102.76	597.81	4.90
APR	3224.32	1856.90	-	-	631.34	-	93.21	-	66.96	535.21	4.90
MAY	3243.26	1872.38	-	-	725.40	-	14.40	-	559.22	559.22	4.90
JUNE	3887.11	1802.23	67.99	-	719.02	220.50	378.79	-	119.30	574.08	5.20
JULY	3876.96	1789.61	297.40	-	674.56	441.00	79.19	-	52.09	537.91	5.20
AUG	4634.68	2669.02	357.91	-	736.48	220.50	46.24	-	176.09	422.64	5.80
SEPT	3323.23	1572.57	29.03	-	748.03	258.72	62.15	65.55	177.40	404.88	4.90
OCT	3507.48	1760.90	-	-	735.22	220.50	67.42	-	205.12	509.52	8.80
NOV	2285.45	1107.26	-	-	761.61	-	55.08	-	168.42	186.38	6.70
DEC	5708.26	1801.46	-	-	1136.45	-	132.06	-	275.39	2350.40	12.50
TOTAL	42152.71	22139.81	752.33	26.97	8015.65	1405.78	1127.23	65.55	1462.50	7087.59	69.30

\* SUNDAY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE \$5425.10

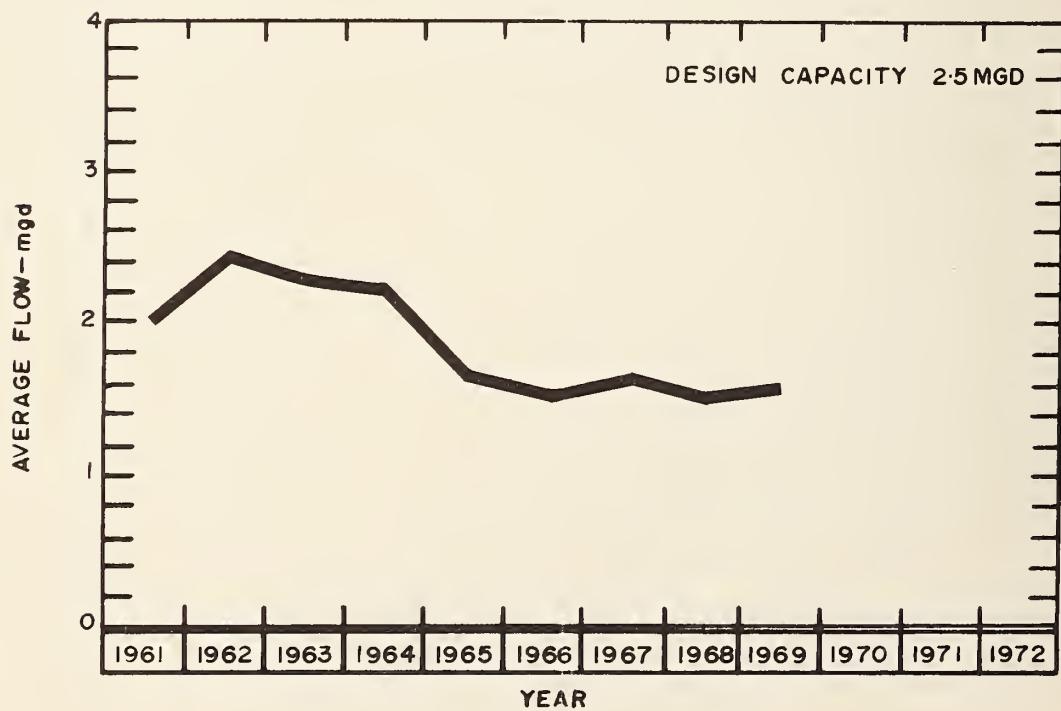
---

**PROCESS DATA**

---



## FLows



## PLANT FLOWS and CHLORINATION

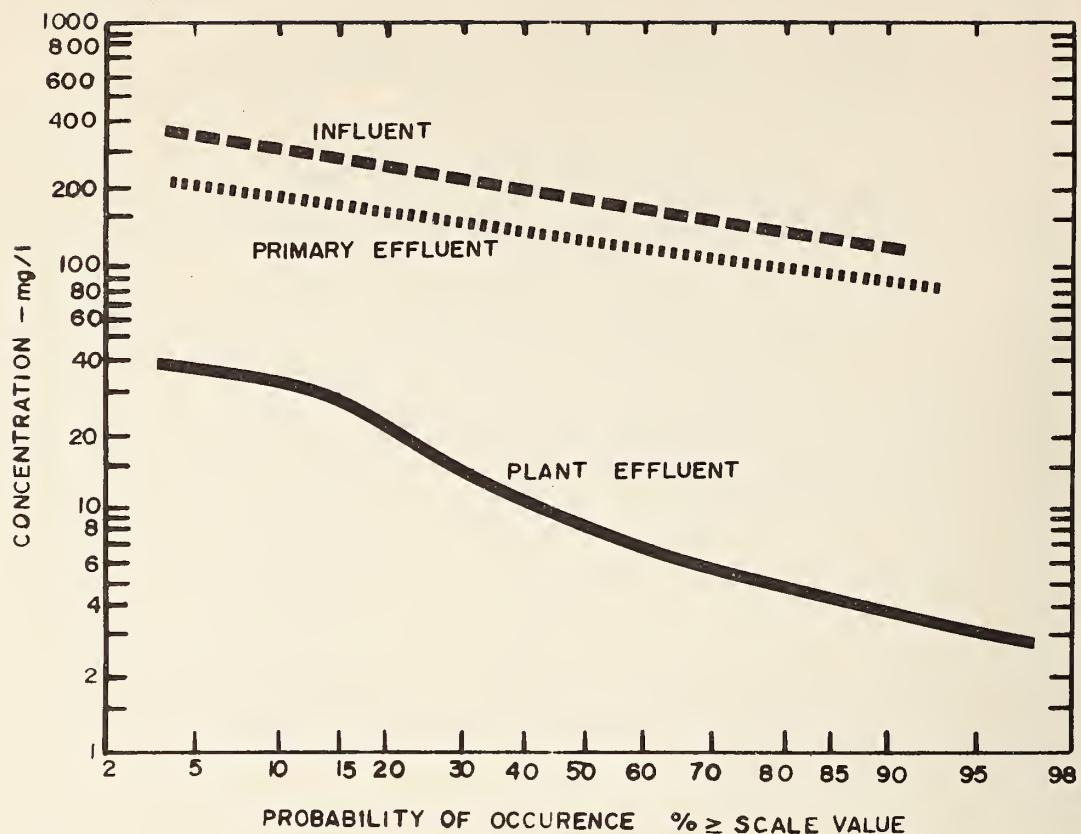
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	53.5	1.7	3.40	.45	0	0
FEB	46.2	1.6	2.18	1.02	0	0
MAR	49.8	1.6	2.96	1.06	0	0
APR	53.3	1.8	2.94	.86	0	0
MAY	58.9	1.9	2.76	1.19	1358*	4.8
JUNE	47.7	1.6	1.97	1.12	1931	4.0
JULY	48.1	1.6	2.46	.78	1854	3.9
AUG	42.8	1.4	1.95	1.05	1643	3.8
SEPT	47.1	1.6	1.80	1.20	1480	3.1
OCT	49.9**	1.6	1.80	1.20	640*	2.5
NOV	+	-	-	-	0	0
DEC	+	-	-	-	0	0
TOTAL	594.9++	-	-	-	8906	-
AVERAGE	-	1.6	-	-	1781	3.6

\*Chlorination practised between May 16 and October 15.

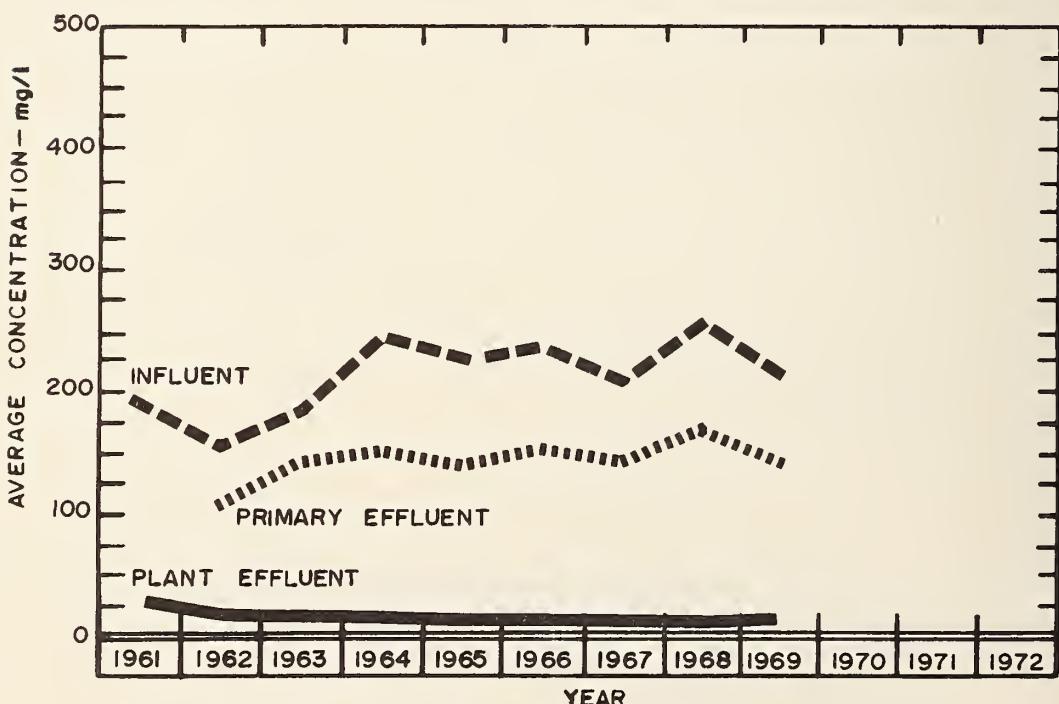
\*\* Prorated on 12 days' data

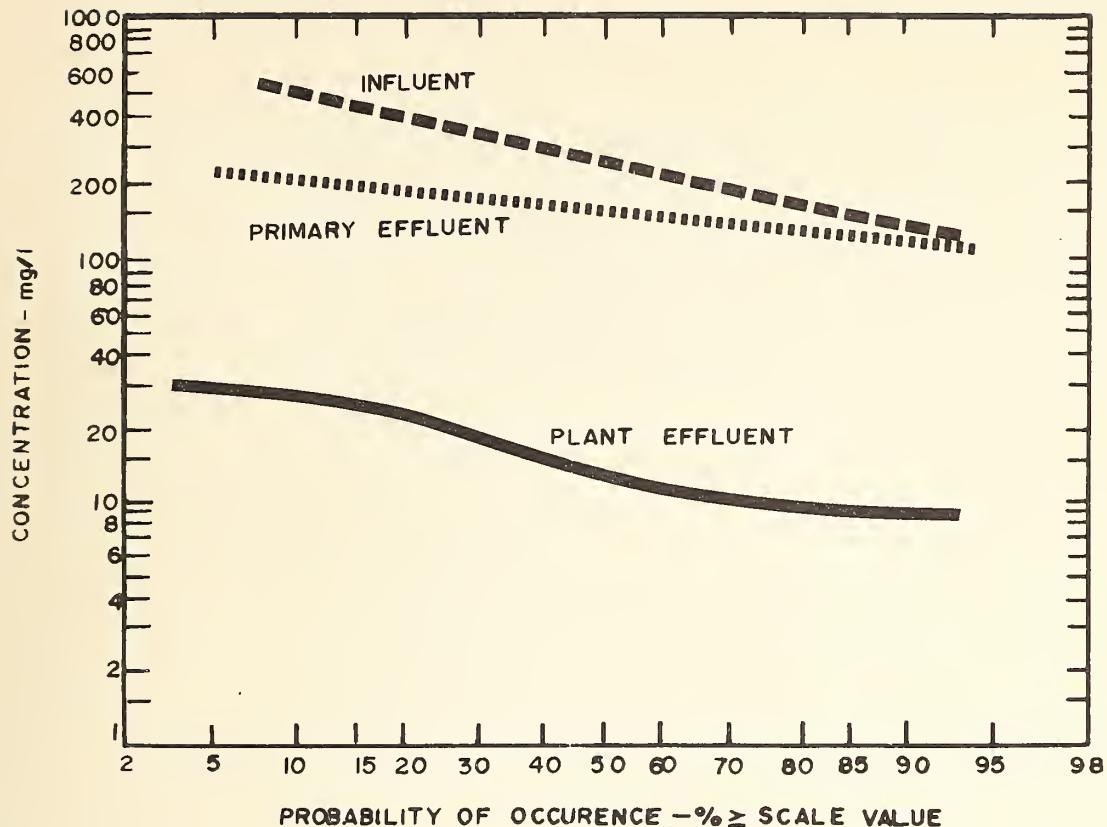
+ Meter out of service

++ Total flow prorated on 304 days' data

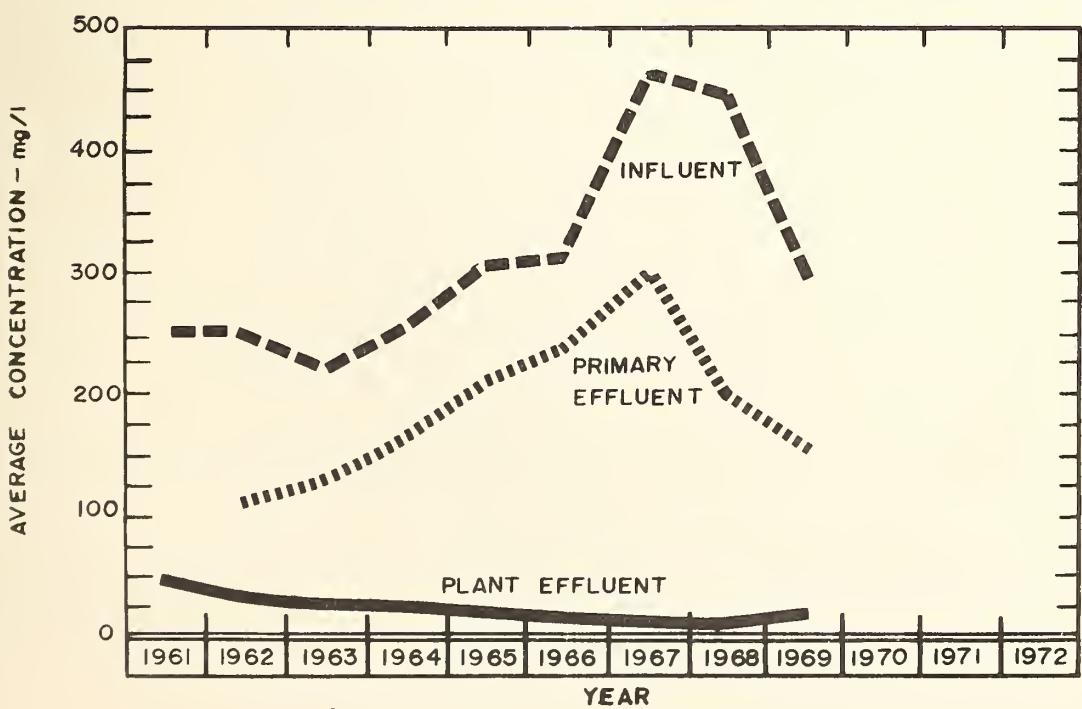


## BIOCHEMICAL OXYGEN DEMAND





## SUSPENDED SOLIDS

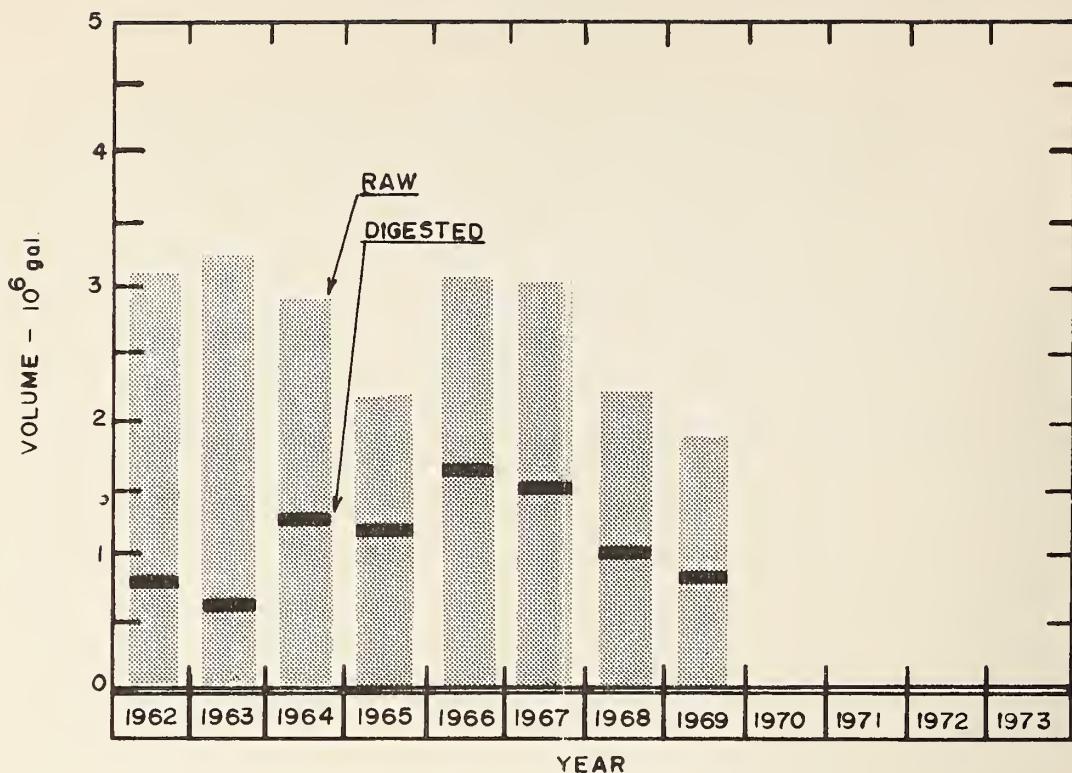


# PLANT EFFICIENCY

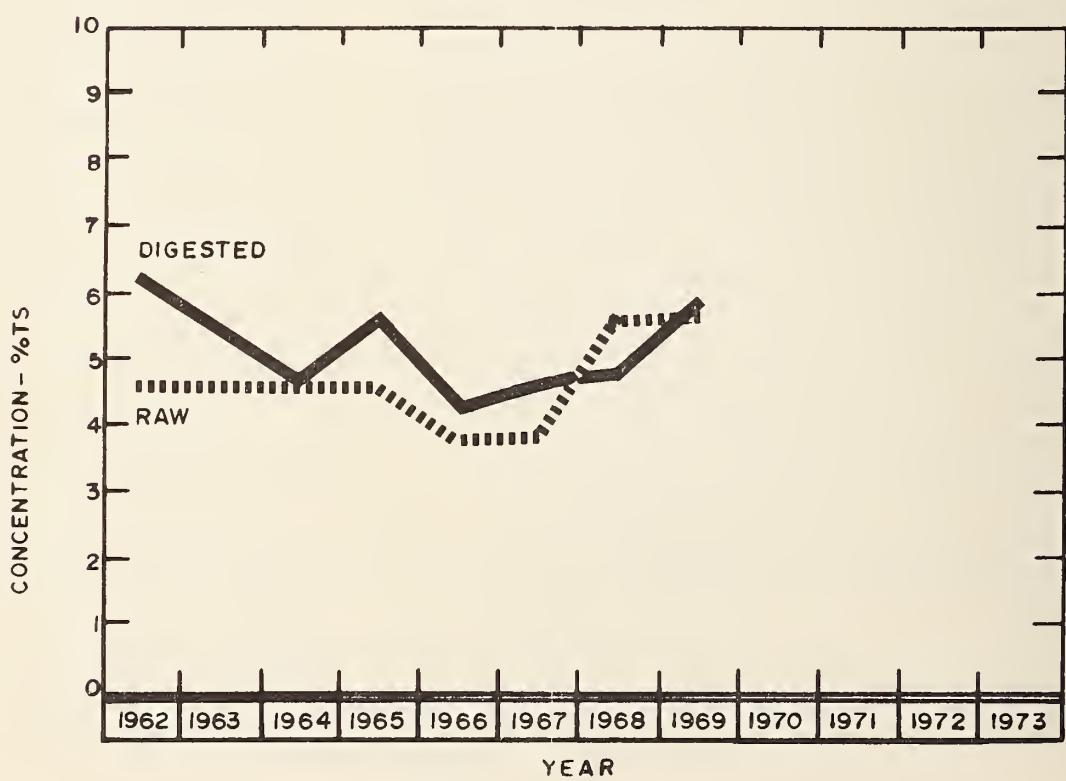
MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL  cu ft	
	INF. mg/l	EFF. mg/l	REDUCTION		INF. CONCN mg/l	EFF. CONCN mg/l	REDUCTION			
			%	$10^4$ pounds			%	$10^4$ pounds		
JAN	270	22	92	13.3	550	8	98	29.0	14	
FEB	200	13	94	8.6	325	20	94	14.1	43	
MAR	130	6	95	6.2	200	10	95	9.4	15	
APR	135	8	94	6.8	205	15	93	10.1	38	
MAY	340	13	96	19.3	410	10	98	23.6	43	
JUNE	155	7	95	7.1	200	10	95	9.1	12	
JULY	215	6	97	10.0	195	15	92	8.7	30	
AUG	242	8	97	10.0	402	15	95	16.6	43	
SEPT	240	8	97	11.9	405	10	97	18.6	24	
OCT	260	7	97	12.6	255	22	91	11.6	67	
NOV	190	19	90	-	190	18	91	-	14	
DEC	207	67	67	-	257	84	67	-	17	
TOTAL	-	-	-	-	-	-	-	-	360	
AVERAGE	215	15	93	10.6	299	20	93	15.0	30	

# AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M lb BOD lb MLSS	AIR USED 1000 cu ft lb BOD	WASTE SLUDGE $10^3$ pounds
		BOD mg/l	SS CONCN mg/l	BOD mg/l	SS CONCN mg/l				
JAN	1.7	150	200	22	8	1350	.24	.976	-
FEB	1.6	140	190	13	20	1890	.15	1.050	20.8
MAR	1.6	90	65	6	10	1870	.06	1.597	6.0
APR	1.8	120	130	8	15	1700	.16	1.083	-
MAY	1.9	200	150	13	10	2220	.22	.607	-
JUNE	1.6	96	140	7	10	2280	.08	1.943	45.2
JULY	1.6	160	135	6	15	2270	.14	1.298	32.8
AUG	1.4	152	155	8	15	1610	.17	1.630	72.4
SEPT	1.6	180	185	8	10	2360	.15	1.192	27.2
OCT	1.6	160	195	7	22	2340	.14	1.058	8.8
NOV	-	150	135	19	18	2740	-	-	-
DEC	-	150	185	67	84	2500	-	-	20.6
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	1.6	145	155	15	20	2180	.15	1.036	33.4



## DIGESTION



# SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME $10^5$ gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME $10^5$ gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	1.7	4.8	61	.8	7.2	43	-	.1	0	502
FEB	1.3	5.4	62	.7	6.3	46	-	.3	0	415
MAR	1.8	5.7	62	.6	5.3	49	-	.7	0	354
APR	2.3	5.7	65	.7	6.6	58	-	.6	0	391
MAY	1.7	5.3	66	.8	4.3	59	-	.4	0	472
JUNE	1.7	6.3	63	.8	5.7	43	-	.6	0	483
JULY	1.2	7.2	65	.6	4.0	48	-	1.4	0	350
AUG	1.7	6.5	72	.5	6.9	47	-	2.2	0	291
SEPT	1.3	7.7	65	.8	5.9	49	-	.8	0	448
OCT	1.6	5.4	-	.9	-	-	-	-	0	495
NOV	1.4	-	-	.6	-	-	-	-	0	378
DEC	1.3	4.8	57	.5	4.5	41	-	-	0	289
TOTAL	19.0	-	-	8.3	-	-	-	-	0	4868
AVERAGE	1.6	5.8	63	.7	5.7	48	-	.8	0	406



Date Due

APR 15 1971

ONTARIO WATER RESOURCES COMMISSION  
DIVISION OF PLANT OPERATIONS.

BURLINGTON - DRURY LANE  
OPERATING SUMMARY 1969.

TD227/B87/D78/W38/1969/MOE

DATE	ISSUED TO
ONTARIO	LABORATORY LIBRARY
WATER RESOURCES COMMISSION	asha
1.4.71	A. Diffee

TD227/B87/D78/W38/1969/MOE  
Ontario Water Resources Co  
Burlington Drury  
Lane water pollution asha  
c.1 a aa



Environment Ontario

Water Resources Library

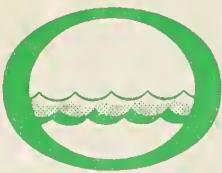
100 Lakeshore Road, Suite 200

Burlington, Ontario L7R 3V6  
Canada

TD  
367  
.A56  
B874  
1969

Burlington Drury Lane : water  
pollution control plant.

81574



*Water management in Ontario*